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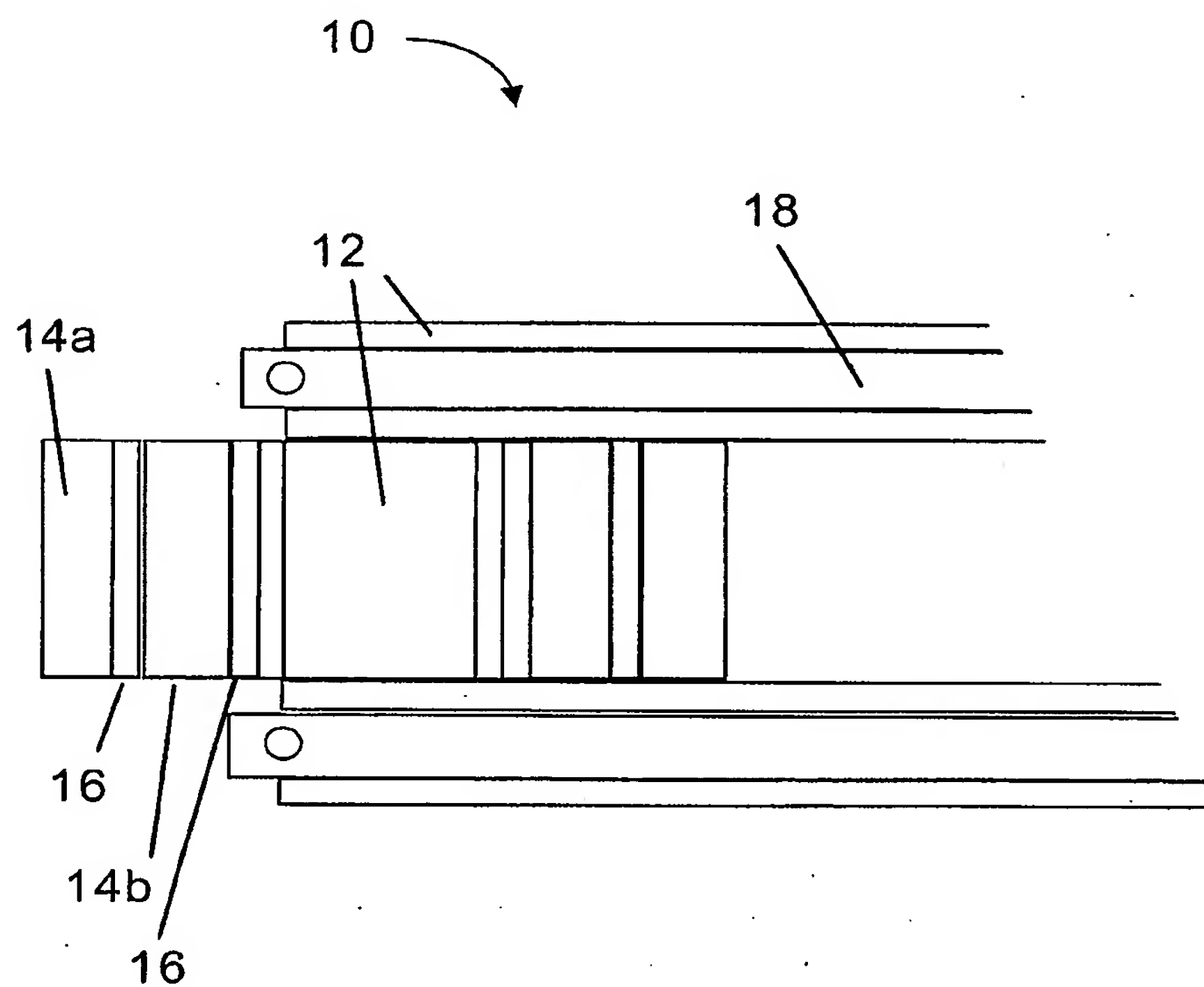


Figure 1

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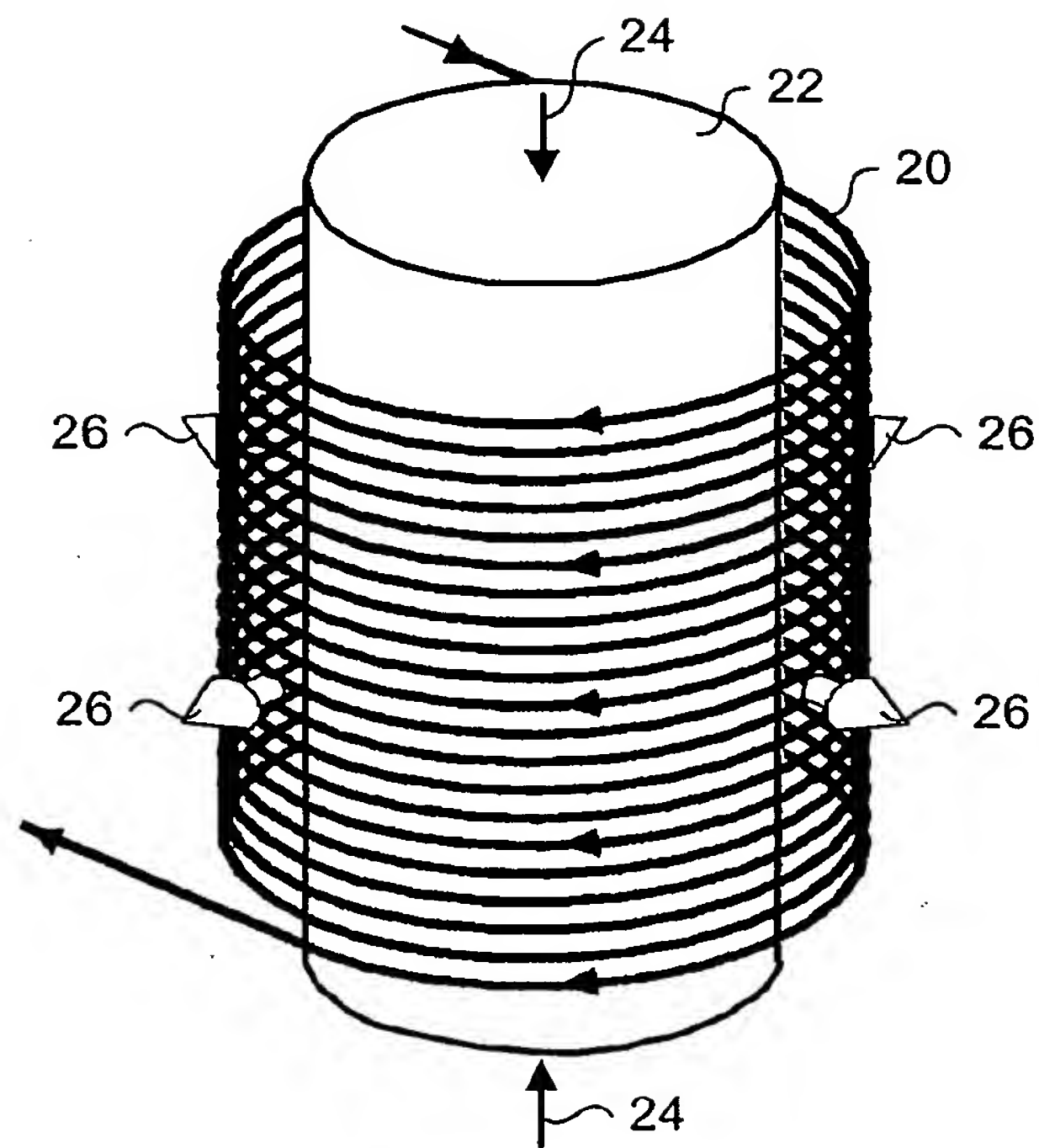


Figure 2

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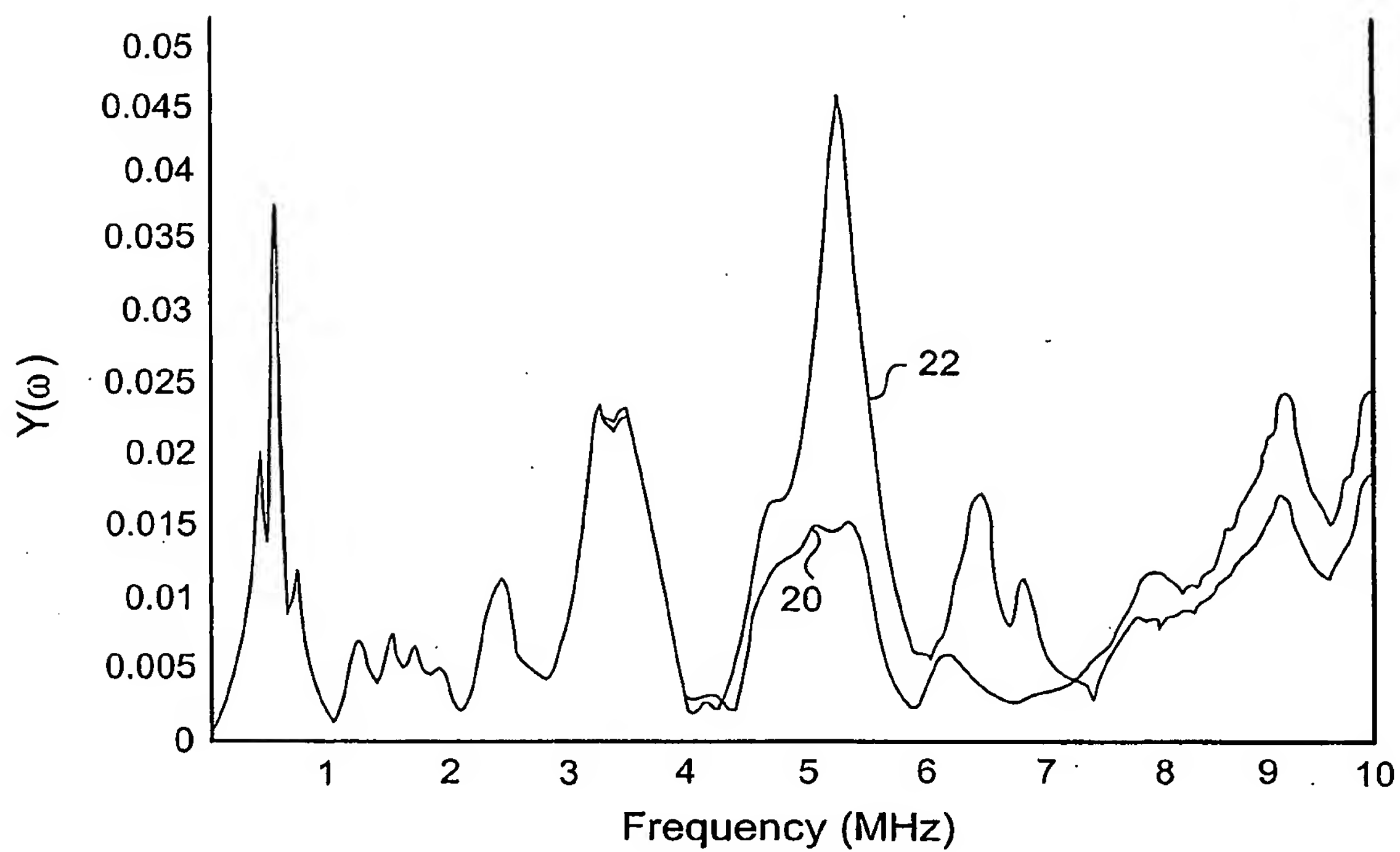


Figure 3

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1 for sensing end
 2 for receiving end
 coil 1: a1, a2
 coil 2: b1, b2
 coil 3: c1, c2

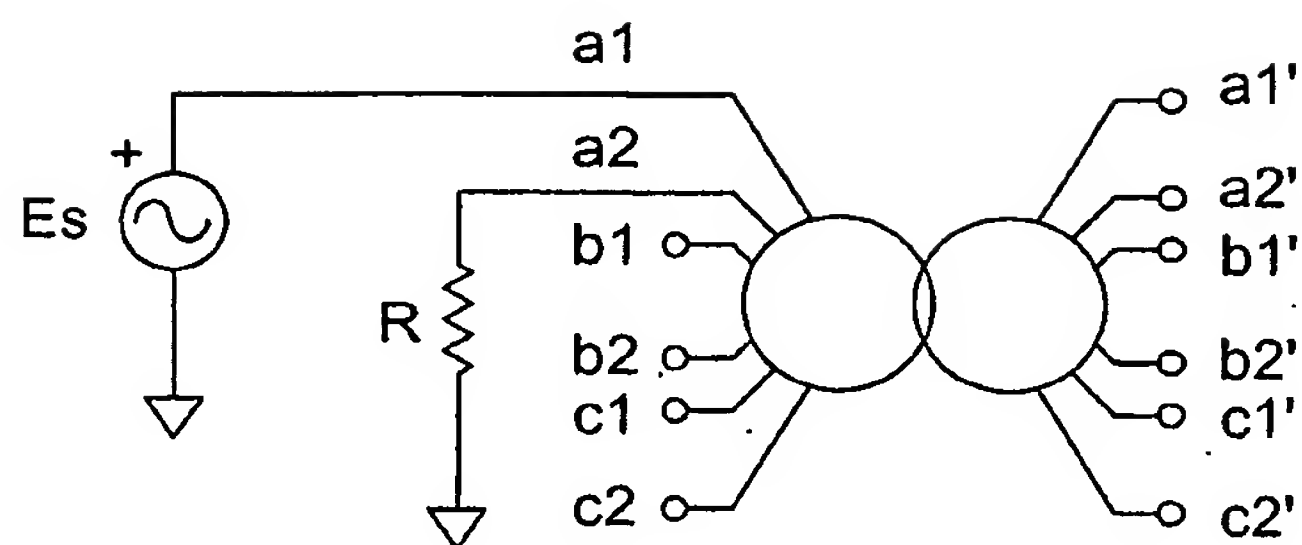


Figure 6

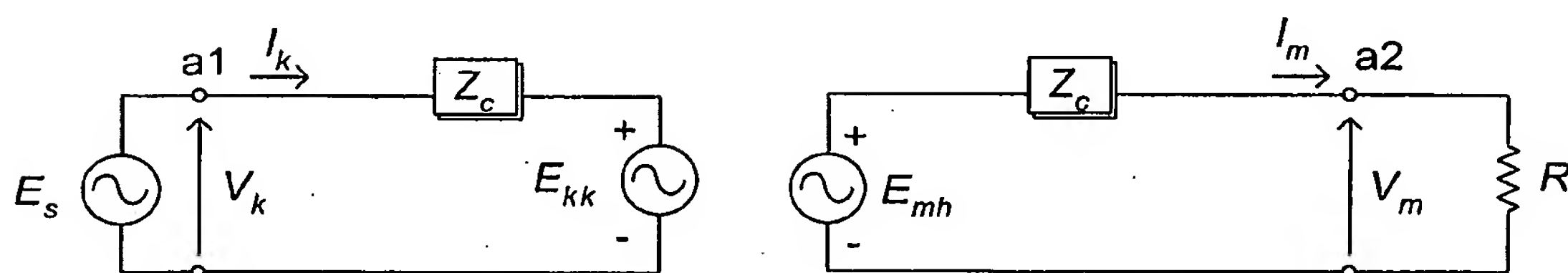


Figure 7

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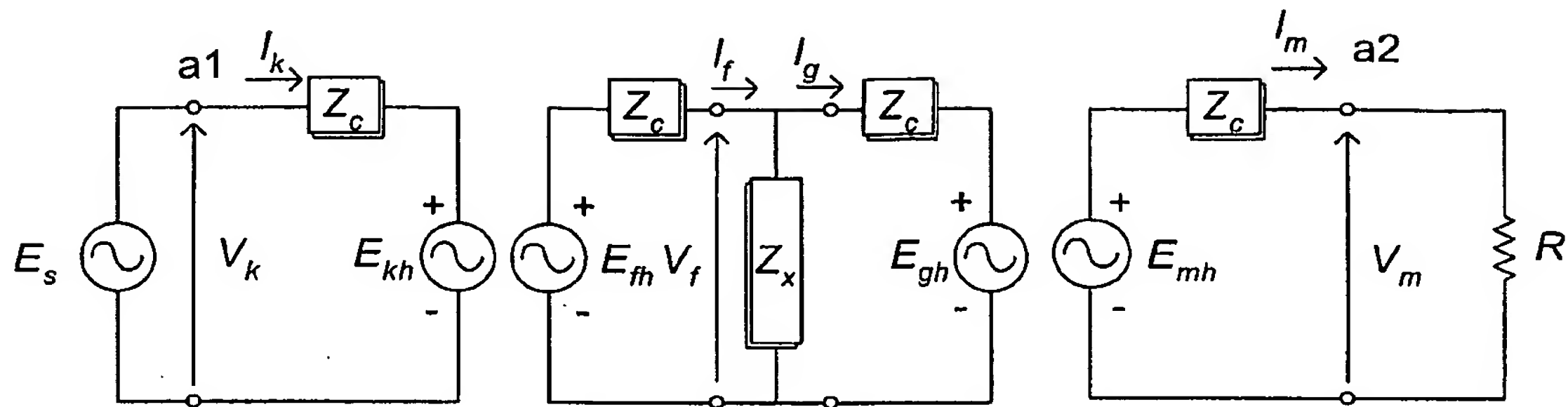


Figure 8

```

% Matlab script for solving the nonlinear equations
% Define the nonlinear equations
F1 =  $V_k - Z_c I_k - (V_f - Z_c I_f) e^{-\gamma_1}$ 
F2 =  $(V_k + Z_c I_k) e^{-\gamma_1} - V_f + Z_c I_f$ 
F3 =  $(I_m R - I_m Z_c) e^{-(\gamma + \gamma_1)} - \frac{V_f Z_c}{Z_x} - V_f - Z_c I_f$ 
F4 =  $(V_f + Z_c I_f - \frac{Z_c V_f}{Z_x}) e^{-(\gamma + \gamma_1)} - I_m R + Z_c I_m$ 
F = [F1; F2; F3; F4];
% Set initial values
x0 = [0; 0; 0; 0];
options = optimset('Display','iter');
% Solve
[x,fval] = fsolve(F,x0,options)

```

Figure 9

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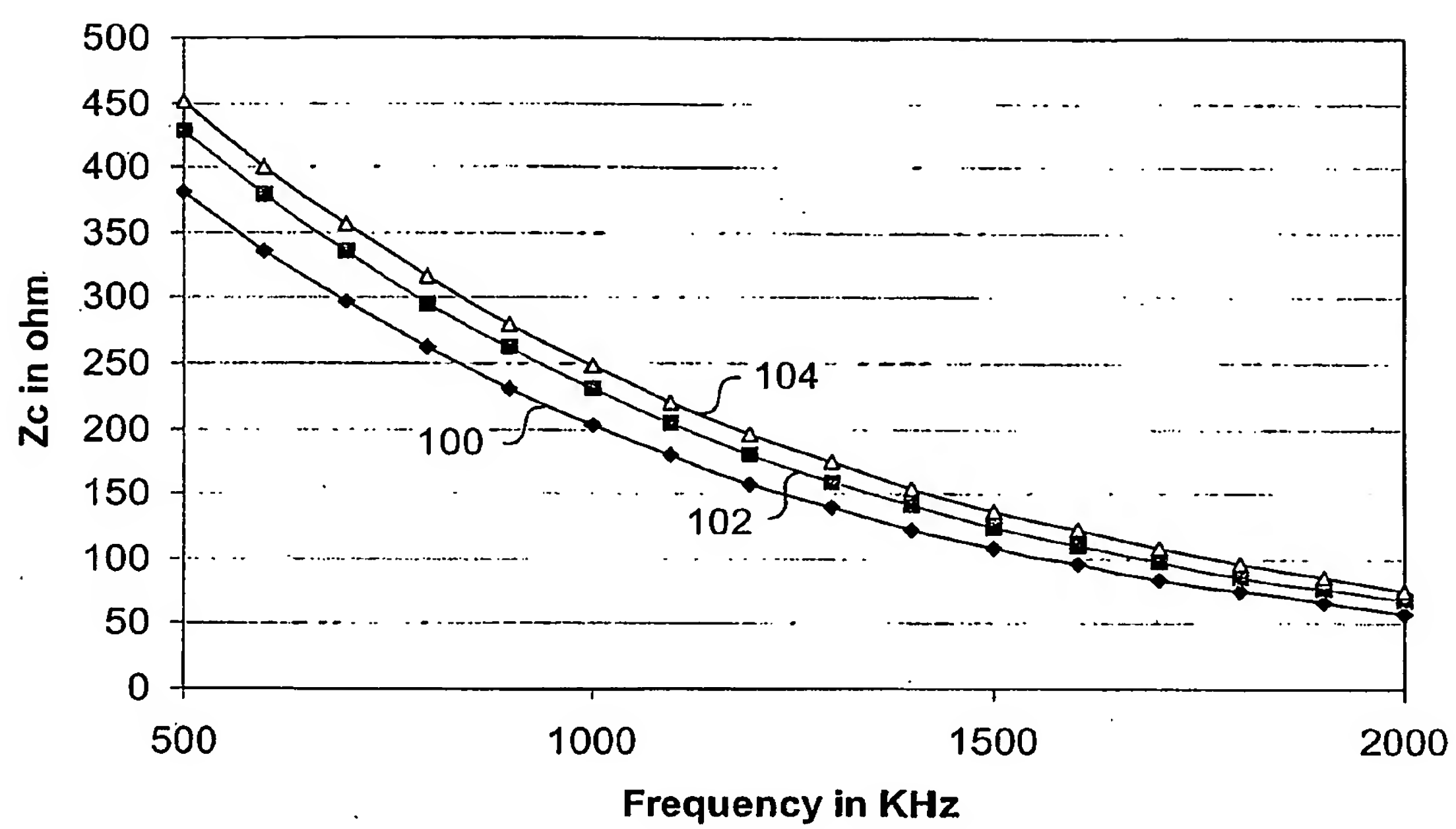


Figure 10

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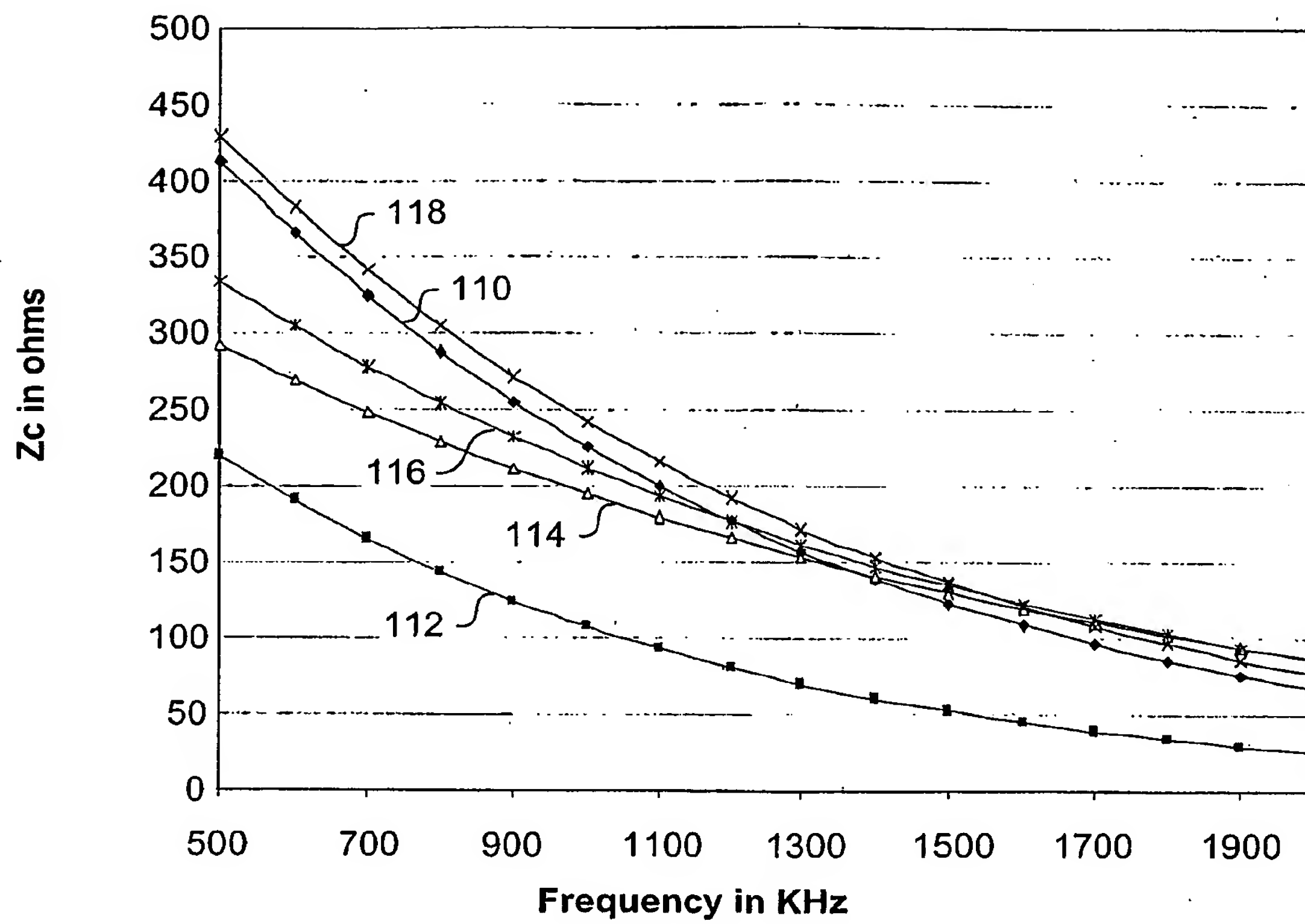


Figure 11

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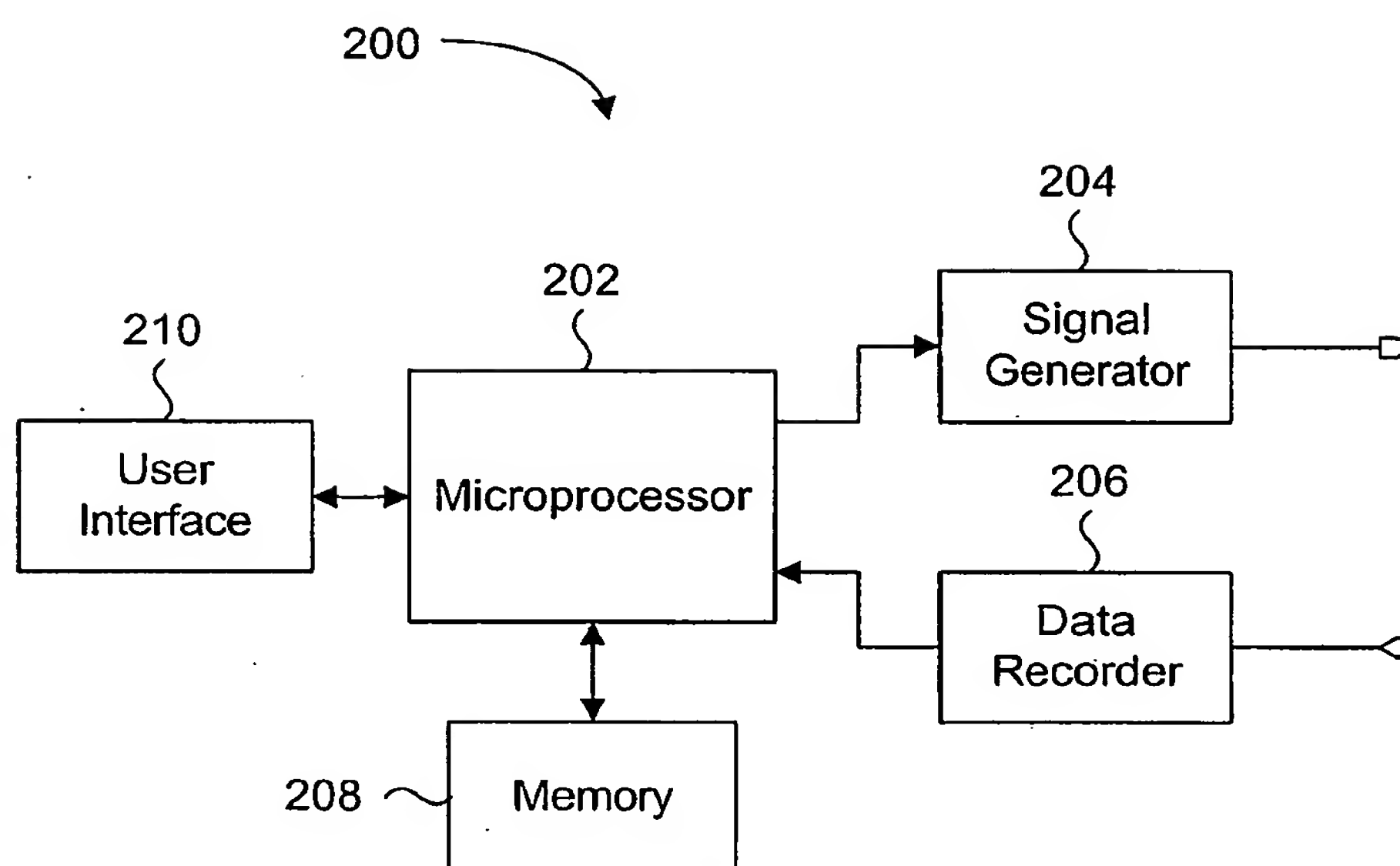


Figure 12

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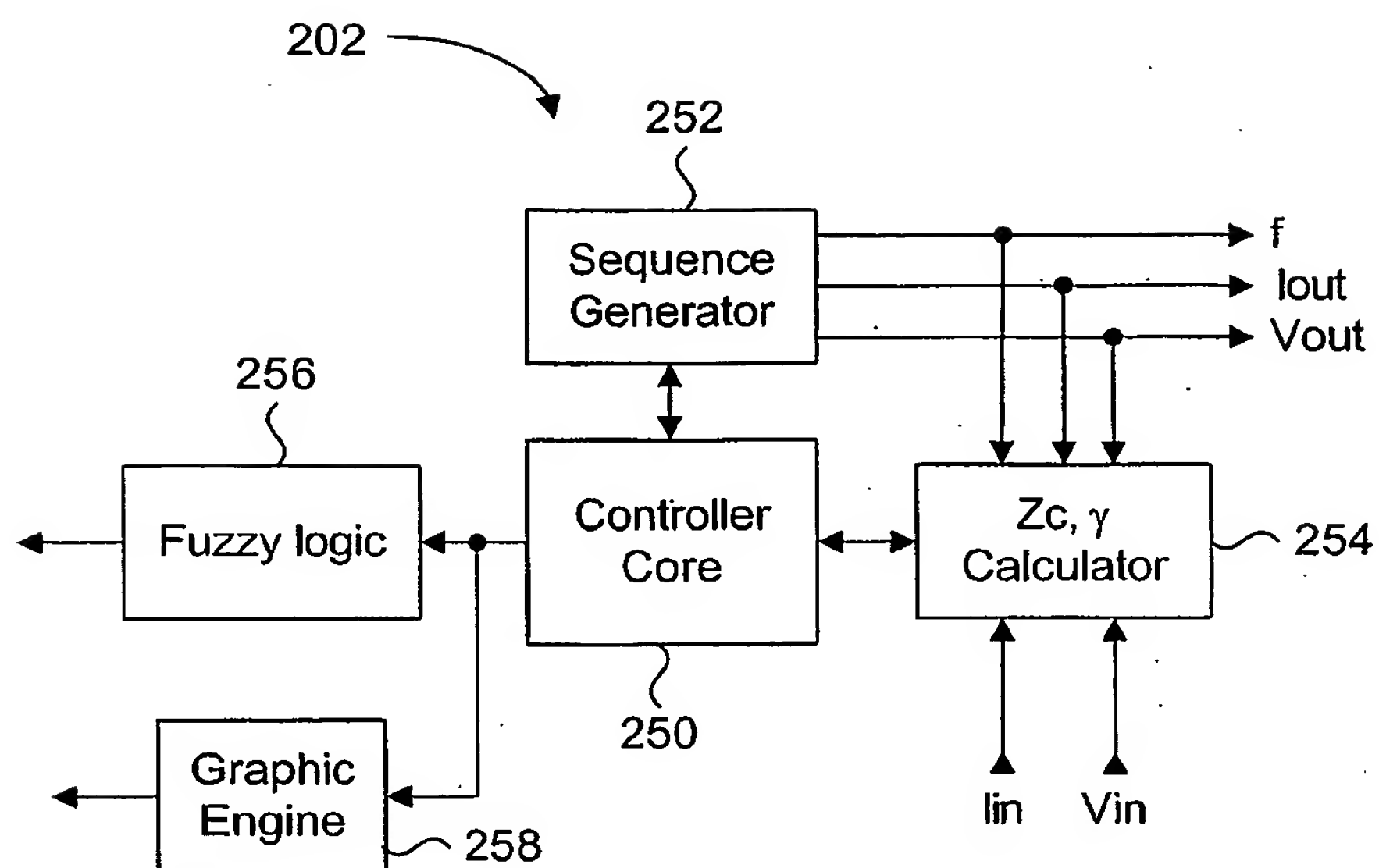


Figure 13

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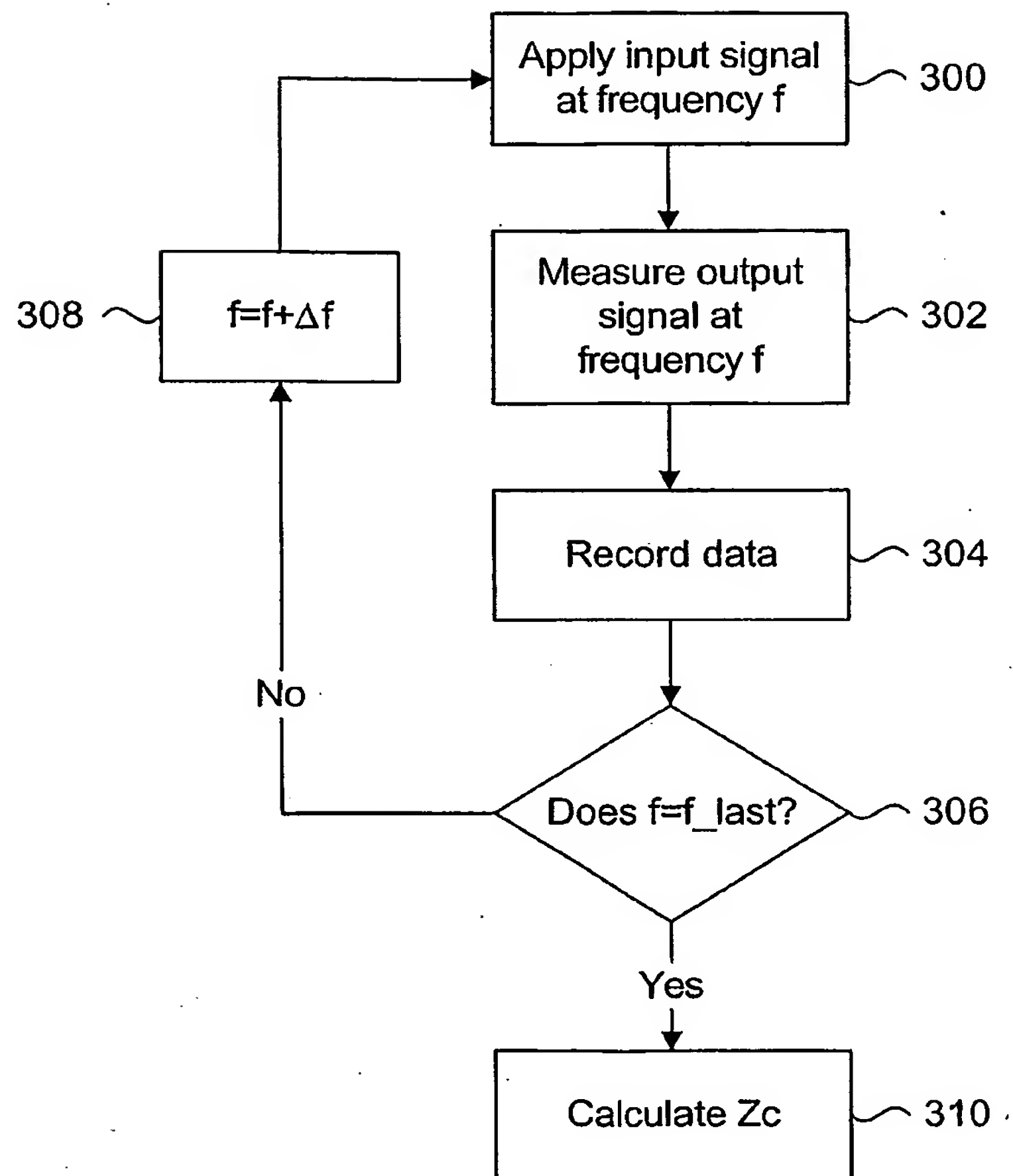


Figure 14

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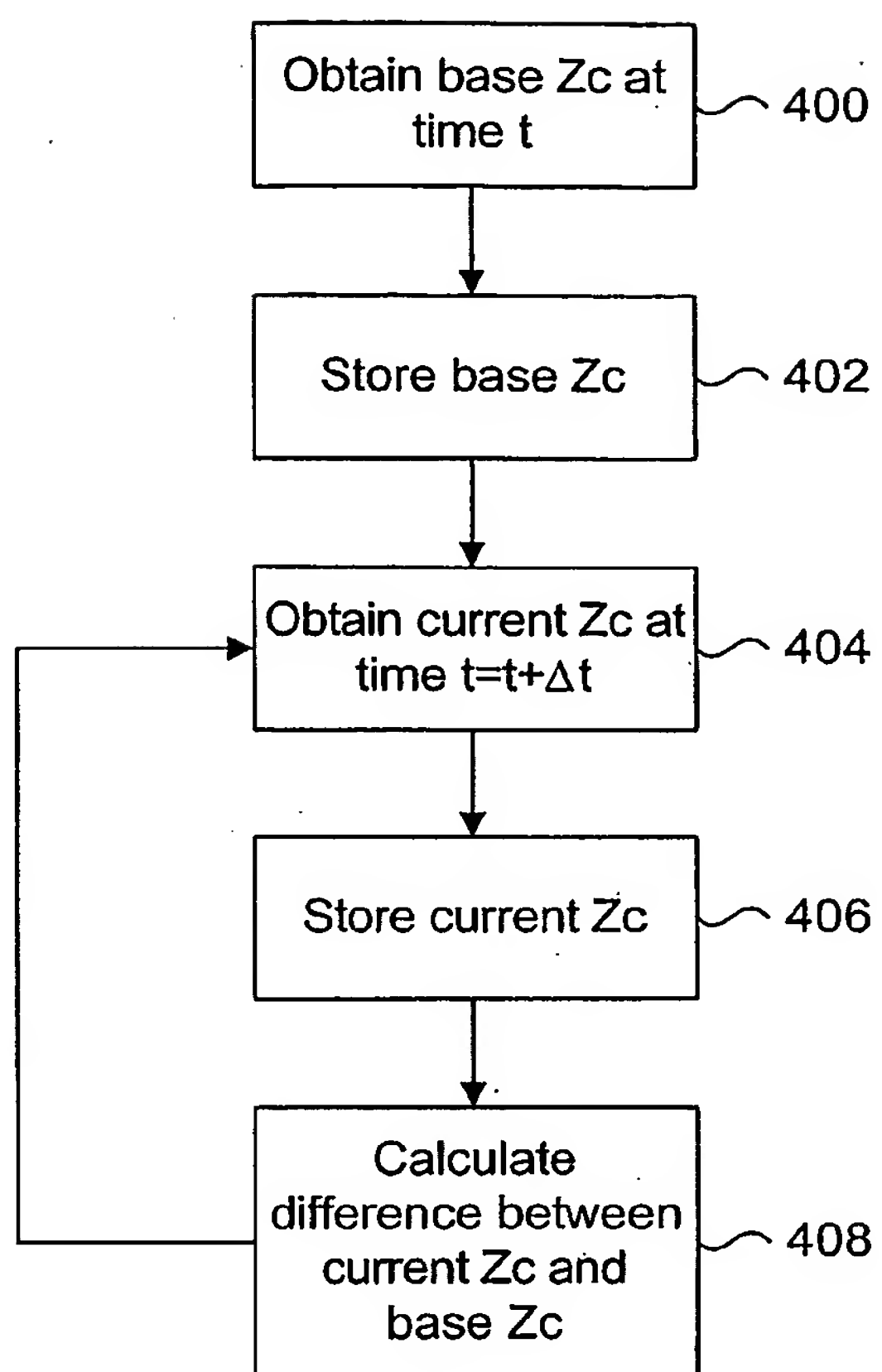


Figure 15